

*If you have any questions, please ask your physician or nurse.*

## Heart Health after Cancer Treatment

Most cancer survivors do not develop heart problems. However, there are some types of cancer treatment that may cause problems with the heart. Since heart problems may occur many years after cancer treatment, it is important for cancer survivors to be aware of any treatments they may have received that can affect the heart. That way, they can take steps to keep their heart healthy. This includes regular medical check-ups and tests to monitor heart function. If a problem develops, it can be detected and treated early.

### Cancer treatments that can cause heart problems

#### **Chemotherapy**

Chemotherapy medicines called anthracycline antibiotics can cause heart problems during treatment or many years later. Anthracycline antibiotics include:

- Daunorubicin (daunomycin)
- Doxorubicin (Adriamycin®)
- Idarubicin
- Epirubicin
- Mitoxantrone

Anthracyclines may cause problems with heart muscle function in which the heart does not contract and relax normally. This can lead to conditions that make it harder for your heart to pump blood to the rest of your body, such as left ventricular dysfunction and cardiomyopathy.

Arrhythmias (irregular heartbeats) can occur when there are changes in the electrical pathways that conduct impulses to control heart rhythm. The pathways may be scarred or damaged. This can cause abnormally fast, slow or irregular heartbeats.

#### **Radiation**

Radiation therapy to the chest or spine area around the heart may result in scarring and stiffening of the heart tissues. This can cause the following conditions:

- Arrhythmias
- Problems with the heart muscle (cardiomyopathy)
- Heart valves problems (valvular stenosis or insufficiency)
- Blood vessels problems (coronary artery disease)
- Problems with the membrane surrounding the heart (pericarditis or pericardial fibrosis)

## **Risk factors for heart problems**

Some other medical conditions may also increase the risk of heart problems from chemotherapy or radiation therapy. These include the following:

- Obesity
- High blood pressure
- High cholesterol or triglyceride levels in the blood
- Diabetes

You may have a higher risk of having heart problems if these conditions run in your family. Heart disease is also more common in women who have gone through menopause. Female survivors who go through an early menopause may be at higher risk. Many health behaviors can add to the risk of heart disease including smoking, having an inactive (sedentary) lifestyle and eating a diet high in fat.

### ***Cancer treatment risks for developing heart problems***

The risk of developing a heart problem after cancer treatment is related to several factors:

- Age of the patient at the time of cancer therapy
- Total dose of anthracycline chemotherapy
- Total dose of chest radiation
- Amount of the heart tissue included in the radiation treatment field
- Treatment with other medications that affect heart function
- Presence of other conditions that affect heart function

Overall, the risk of developing heart problems after cancer therapy is highest in survivors treated with higher doses of anthracyclines or chest radiation, especially those who received both treatments at a young age.

It is unknown why some survivors develop heart problems after treatment for cancer and others do not (even when they have gotten the same treatment). Therefore, it is important for each cancer survivor treated with anthracyclines or chest radiation to continue to have regular medical check-ups so that if a problem with the heart develops, it can be detected and treated early.

## **Symptoms of heart problems**

Mild to moderate heart problems sometimes show no symptoms. The heart problem may only be found by cardiac studies such as tests like an echocardiogram (echo), an electrocardiogram (EKG or ECG) or a multigated acquisition (MUGA) scan. However, symptoms that may be signs of heart problems include the following:

- Shortness of breath
- Dizziness
- Lightheadedness, fainting or near fainting
- Severe fatigue preventing exercise or normal play, activities

- Chest pain that feels like a heavy pressure or fullness and travels to your arm, chin or face
- Sweating, nausea or shortness of breath with chest pain
- Sharp, piercing pain in the center or the left side of your chest (often worsens with taking a deep breath)
- Very swollen feet or ankles (so swollen that if a finger is pressed firmly on the area for a few seconds, it leaves an indentation)
- Cough and wheezing that does not go away
- Periods of heart racing or throbbing
- Periods of irregular heartbeat (feeling of your heart skipping beats)

## Effects of exercise on the heart

Survivors treated with anthracyclines and chest radiation therapy should check with their healthcare provider before beginning any intensive exercise program. If you choose to engage in strenuous activity or team sports, you should discuss activity guidelines and a plan for ongoing monitoring with your cardiologist (heart specialist). Aerobic exercise (brisk walking, jogging) is generally safe and healthy for your heart. However, discuss exercise activities with your cardiologist or healthcare provider before beginning any exercise program.

## Other heart stressors

If your heart has been affected by anthracyclines and chest radiation, you may not be able to handle the stress of certain conditions that increase the heart rate, blood pressure or blood volume in the body more than usual. These changes may occur during **pregnancy** or during illnesses with **high fevers**. If your cancer treatment included medicines that can affect heart function, be sure that your healthcare provider is aware so that steps can be taken to reduce the stress on your heart.

Some drugs can increase stress on your heart, including the following:

- Diet pills
- Ephedra (ma huang)
- Cocaine
- Performance-enhancing drugs (anabolic steroids, human growth hormone)

These types of drugs may cause worsening heart function and even death in cancer survivors who received anthracycline chemotherapy.

## Special precautions

Survivors with leaky or scarred heart valves or those with currently active chronic graft-versus-host disease (cGVHD) following a stem cell transplant may need to take an antibiotic before dental work or any invasive procedure. Some of these procedures include:

- Dental procedures
- Respiratory tract procedures
- Gastrointestinal procedures
- Urinary tract procedures

Bacteria entering the bloodstream during such procedures may cause a serious infection of the heart (endocarditis). The dentist or healthcare professional performing the procedure generally will prescribe the antibiotic. A wallet card for people with heart valve problems (including instructions about the types of procedures for which antibiotic prescriptions are necessary) is available from the American Heart Association website. Please see [Heart.org](http://Heart.org) and search "IE wallet card."

## Monitoring for heart problems

Anyone treated with anthracycline chemotherapy or chest radiation for cancer should have a yearly check-up, with special attention to any heart symptoms. Testing will be done at the time you enter long-term follow-up based on your age at the time of treatment, total anthracycline dose and radiation dose to your chest, abdomen, or spine (thoracic or whole) and other risk factors. Then, testing will be done as recommended by your healthcare provider. The following tests may be included.

- An **EKG** is used to evaluate your heart rate and rhythm. Electrodes (small sticky patches) will be placed on your chest, arms and legs. Wires will be attached to the electrodes, and the electrical impulses of the heart are then recorded.
- An **echocardiogram** uses ultrasound (high frequency waves) to view the muscle function of your heart and how well your heart pumps. You will lie on a table, and conductive jelly will be applied to your chest. Then, a transducer (a small probe that emits the ultrasound waves) will be placed on your chest to obtain different views of your heart. Slight pressure will be applied on the transducer and can sometimes cause discomfort. The test results will be displayed on videotape and photographed for the physician to review. Many measurements will be done during this test to help find out if your heart muscle is pumping blood well. The ultrasound test also looks at your heart valves to see that they open and close normally. Electrodes will usually be placed on the chest to monitor your heart's electrical impulses during the test.

Echocardiograms are the preferred test for those who received radiation involving the heart. The test provides detailed information about heart structures, including the heart valves.

- A **cardiac stress test** measures heart function during periods when the heart is working hard. During this test, your heart and blood pressure will be monitored while you walk on a treadmill. Cardiac stress testing may be recommended for survivors who received higher doses of radiation and anthracycline chemotherapy. This may be done 5 to 10 years following radiation and repeated, as needed.
- **Blood tests** (lipid profile and fasting glucose) to check for other cardiac risk factors may be done every 3 to 5 years for survivors who received radiation to the heart area.

## Monitoring for female survivors who are pregnant or planning pregnancy

Female survivors who are pregnant or planning pregnancy, and received higher doses of anthracycline chemotherapy and radiation to the heart area may need an evaluation and monitoring by a cardiologist. Patients with the following therapy should alert their provider.

- Anthracycline chemotherapy at a dose of 300 mg/m<sup>2</sup> or more
- Radiation at a dose of 30 Gy (3,000 cGy) or higher to the heart or surrounding tissues
- Radiation to the heart (at any dose) in combination with anthracycline chemotherapy or high doses of cyclophosphamide (Cytoxan®)

Heart monitoring may be necessary due to the extra strain on the heart during the later stages of pregnancy and during labor and delivery. Monitoring may include:

- Echocardiogram
  - Before pregnancy
  - During pregnancy as needed, especially during the third trimester
- Cardiac monitoring
  - During labor
  - During delivery

## Cardiac monitoring results

If a heart problem is found, your healthcare provider will advise you about the follow-up care you need. Sometimes, a referral to a cardiologist is needed for additional evaluation and/or treatment with medications.

## Preventing heart problems

As you get older, the risk of certain types of heart disease (such as heart attacks and hardening of the arteries) increases. Factors that may increase the risk of heart problems include smoking, being overweight, eating a high-fat diet and not exercising. Medical conditions that increase the risk include diabetes, high blood pressure and high blood cholesterol.

You can reduce your risk of heart problems by:

- Not smoking (or quitting if you currently smoke)
- Staying at a healthy body weight
- Limiting the fat in your diet to no more than 30% of calories
- Exercising moderately for at least 30 minutes on most days of the week

If you have diabetes, high blood pressure or high blood cholesterol, keep these under good control with diet or medication as recommended by your healthcare provider. Be sure to report any symptoms of heart problems to your healthcare provider right away.

## For more information

If you have questions, please talk to your healthcare team.

You can find more information about cancer survivorship at the following websites.

- *The Children's Oncology Group Long-Term Follow-Up Guidelines for Survivors of Childhood, Adolescent, and Young Adult Cancers* at [survivorshipguidelines.org](http://survivorshipguidelines.org)
- *National Comprehensive Cancer Network (NCCN) Guidelines for Survivorship (1.2019)* at [nccn.org](http://nccn.org)

## Northwestern Medicine – Health Information Resources

For more information, contact Northwestern Memorial Hospital's Alberto Culver Health Learning Center (HLC) at [hlc@nm.org](mailto:hlc@nm.org), or by calling 312.926.5465. Health information professionals can help you find the information you need and provide you with personal support at no charge.

For more information about Northwestern Medicine, please visit our website at [nm.org](http://nm.org).

*Para asistencia en español, por favor llamar al Departamento de Representantes para Pacientes al 312.926.3112.*

The entities that come together as Northwestern Medicine are committed to representing the communities we serve, fostering a culture of inclusion, delivering culturally competent care, providing access to treatment and programs in a nondiscriminatory manner and eliminating healthcare disparities. For questions, please call either Northwestern Memorial Hospital's Patient Representatives Department at 312.926.3112, TDD/TTY 312.926.6363 or the Northwestern Medical Group Patient Representatives Department at 312.695.1100, TDD/TTY 312.926.6363.

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